USGS

WATER RESOURCES RESEARCH GRANT PROPOSAL

Title: Web-based Data Analysis and Distribution for Watershed Datasets, John Bolte, Department of Bioresource Engineering

Abstract:

Duration: February 1, 2000 - January 31, 2001

Fiscal Year 2000 Funds Requested: Total $13,916
      Direct $ 8,094 + $5,822 (tuition)
      Indirect $ 0

Matching Funds to be Allocated: Total $32,959
      Direct $20,615
      Indirect $12,345

Principal Investigator(s):

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Key Collaborators:

James Moore, Professor
Department of Bioresource Engineering

Congressional District: Oregon #5

Critical Need for Research

Watershed planning is becoming increasingly important for implementation of the Oregon Plan for salmon recovery, the Willamette Restoration Initiative, response to the endangered species listing, Clean Water Act requirements and other activities. Sciencebased planning requires access to data in a way that present that data in a format that is both readily accessible and in forms that can be utilized by policy makers and stakeholders. Various watershed-scale datasets are also integral to the development of watershed assessments by watershed councils using the Oregon watershed Enhancement Board's Watershed assessment manual, which prescribes specific required data sets and reporting requirements.

Goals and Objectives

>1. To make water policy and analysis information from the Pacific Northwest Water Law & Policy Project available in electronic format through the OWRRI web site.

>2. To analyze the existing information base to determine future directions and improvements in water policy for the PNW.

Methods, Procedures, and Facilities:

Technology has progressed to the point where the development of dataset storage and delivery mechanisms is feasible at a reasonable cost. The Internet provides the necessary access and delivery mechanism, and is generally available to a wide audience. Additional server-based software has made the presentation and downloading of datasets from the web to be feasible. We have been involved in these activities for both spatial and non-spatial datasets for the last several years and propose to leverage our existing web technology for dataset display and delivery to allow access by watershed councils. We will further utilize our activities in a related project with two watershed councils (Long Tom and South Santiam) to focus specifically on providing data access and analysis tools as a technology prototype/demonstration. The technology will be folded into the OSU Water Connection and OWRRI web sites.

Web-based data analysis and distribution require the following components:

>· Data serve and associated disc storage;

>· Server software providing access to and display of non-spatial datasets;

>· Server software^providing access to and display of spatial (GIS) datasets; and

>· Server software providing data analysis and reduction capabilities.

Data server: We currently have a hardware (Window NT, 12 GB of storage, biosys.bre.orst.edu) located in the Bioresource Engineering Department specifically for hosting data-oriented web sites. We propose to utilize this machine to host the data sets, technology development, and ultimately as an alternative or mirrored host for osu.orst.edu.

Server Software for non-spatial datasets: After an intensive review of web-based server software for nonspatial databases, we are proposing to use Allaire's Cold Fusion Application serves. Cold fusion is a cross platform, running on both NT Server and Unix

OS's. Cold Fusion will also run applications on OSU's main web server, which makes application portable between NT and Unix hosts.

Server Software for spatial datasets: Many of the datasets for watershed analysis are GIS -based. Depending on the form (shape file, Arec Coverages, etc.), data access programs like Cold Fusion may or may not be appropriate. Cold Fusion does no provide map displays or browsing capability. Several map-based server tools are available, however, including ESRl's Internet Map server and other public domain Java-based tools. We will evaluate the aiternatives when the- new ESRI product is released to determine the most appropriate map server to implement.

Server Software for data analysis and reduction: Because most analytical procedures are need specific, general purpose software are often not appropriate for data analysis. However, useful server tools for developing these procedures are available as web standards. Specifically, the Internet Serve Application Programming Interface IISAPI) provides an efficient, standards-based capability to write server extensions for performing custom web tasks. This program is particularly appropriate for server-based data processing tasks. We propose to work with two watershed councils on a pilot-scale basis to identify critical data analysis and reduction needs and implement these as ISAPI applications, available to web browsers.

Expected Results, Benefits, and Information

We expect to produce example of two types of databases of use to watershed council. The first will include GIS coverages including roads, streams, vegetation, hydrology, sediment transport capabilities, and many others (see http://biosys.bre.orst.edu/restore for a complete list). The complete coverages and maps will be made available on the web, and the interfaces and analysis tool developed to meet the needs of watershed councils.

The second set of data will involve the development of a catalog of photos representing watershed ~problem areas~ and restoration options. A framework will be developed to store the photos and related information, and an interface developed to allow retrieval and analysis.

The results will primarily targeted to watershed councils and governmental regulators involved in watershed restoration.

Technology Transfer

The primary technology transfer method will be through use of the Bioresource Engineering and OWRRI web sites.